

CLAIMS

1. A hydrotapping power unit for powering a hydrotapping tool comprising a shaft adapted to advance and retract the tool with respect to a part contained in a hydroforming die cavity, a first powered device, a lead screw connection connecting said first powered device and said shaft having
5 a thread pitch equal to that of a thread-forming portion of the tool, a second powered device fixed in position in relation to said first powered device and drivingly connected to said shaft and adapted to rotate said shaft in a forward direction and in cooperation with said lead screw connection advance and hold said shaft and thereby the tool in a home position where a piercing end
10 of the tool is located at least substantially flush with the die cavity during hydroforming of the part, said first powered device adapted to cooperate with said lead screw connection to further advance said shaft after the hydroforming of the part and thereby force the piercing end of the tool to pierce a hole in the part while hydroforming pressure is maintained in the
15 part and thereafter continue to advance said shaft causing an extruding portion of the tool to enter the hole and inwardly extrude the part about the hole, said second powered device operable to again rotate said shaft in said forward direction and in cooperation with said lead screw connection further advance the tool and thereby form a thread in the hole with the thread-
20 forming portion of the tool, and said second powered device operable to rotate said shaft in a reverse direction and in cooperation with said lead screw connection retract the tool from the threaded hole at the same said feed rate.

2. The hydrotapping power unit as set forth in claim 1 wherein said first powered device is a hydraulic cylinder and said second powered device is a hydraulic motor.

3. The hydrotapping power unit as set forth in claim 1 wherein said first powered device includes a hydraulically operated piston that is prevented from rotation, and said lead screw connection operatively connects said piston and said shaft.
4. The hydrotapping power unit as set forth in claim 1 wherein said first powered device includes a hydraulically operated piston that is prevented from rotation and is connected to said shaft by said lead screw connection and is adapted to cooperate with said lead screw connection to
5 hold the tool in said home position during the hydroforming of the part and also the piercing of the part.
5. A hydrotapping power unit as set forth in claim 1 wherein said first powered device is adapted to also advance a hole- sizing portion of the tool and then a relief portion of the tool into the pierced hole and wherein the hole- sizing portion has a partial thread with the same pitch as the thread-
5 forming portion of the tool, and said second powered device is adapted to start forward rotation of said shaft while the relief portion of the tool is in the pierced hole following the entry of the hole-sizing portion.
6. A hydrotapping power unit as set forth in claim 1 wherein said first powered device is a stationary hydraulic cylinder having a non-rotatable piston connected by said lead screw connection to said shaft, and said second powered device is a stationary hydraulic motor.
7. A hydrotapping power unit as set forth in claim 1 wherein a coupling device maintains a drive connection between said second powered device and said shaft throughout linear movement of said shaft with respect to said second powered device.

8. A hydrotapping power unit as set forth in claim 1 wherein said powered devices and said shaft have a common centerline.

9. A hydrotapping power unit as set forth in claim 1 wherein said powered devices are adapted to be operated at various speeds of operation.

10. A hydrotapping power unit as set forth in claim 1 wherein said second powered device is mounted on said first powered device.